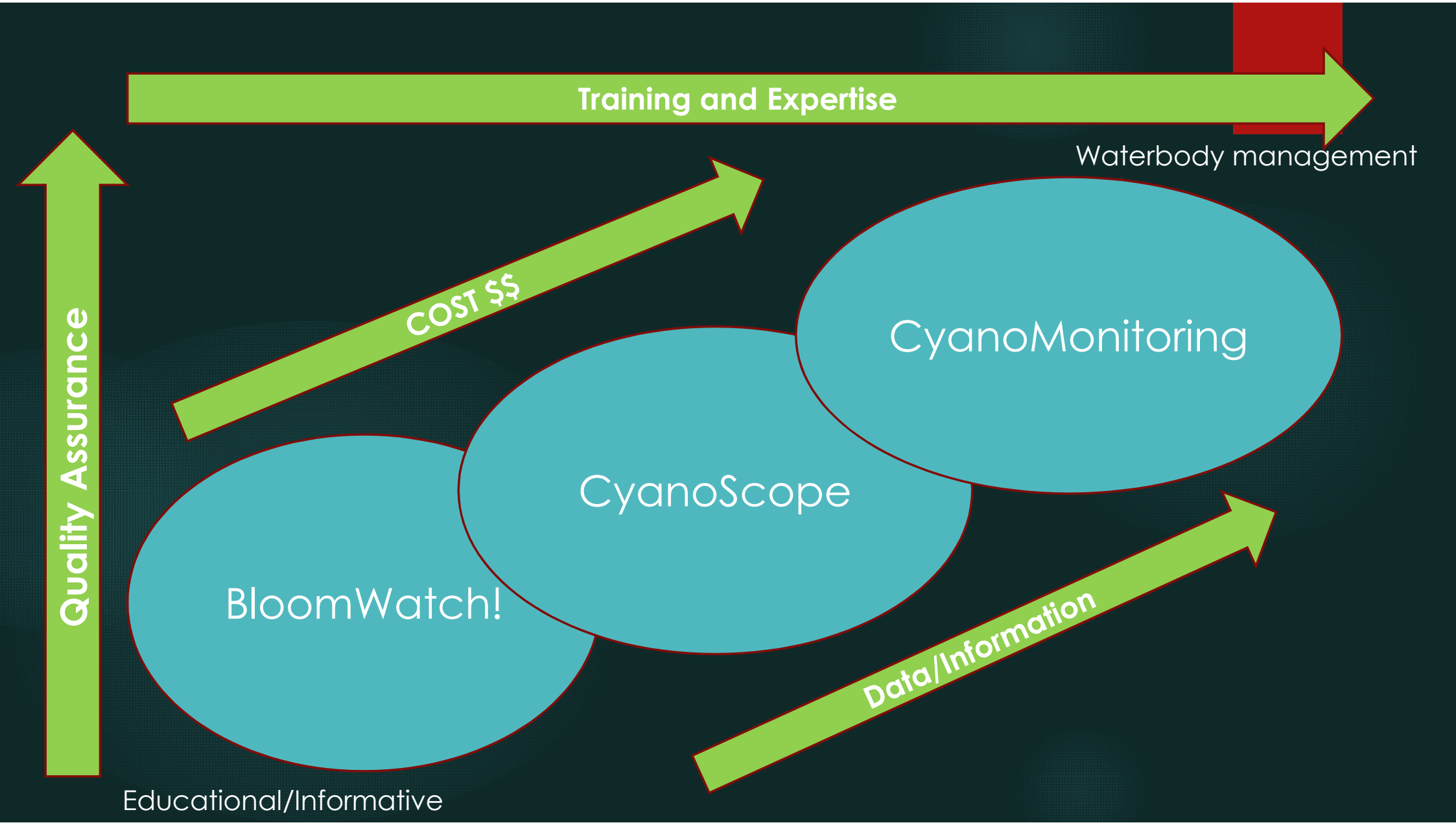
New England Regional Cyanobacteria Monitoring an Overview

NWQMC CONFERENCE

WEDNESDAY MAY 4, 2016

HILARY SNOOK USEPA REGION 1 LABORATORY

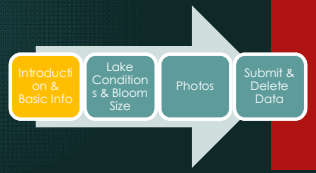

Training and Expertise
Waterbody management
Quality Assurance
COST $$
CyanoMonitoring
CyanoScope
BloomWatch!
Data/Information
Educational/Informative

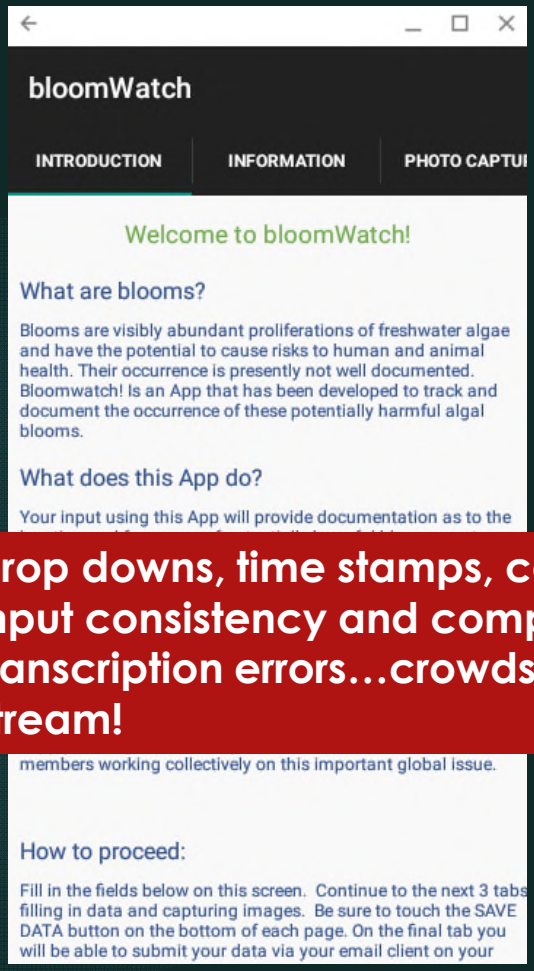
BloomWatch!

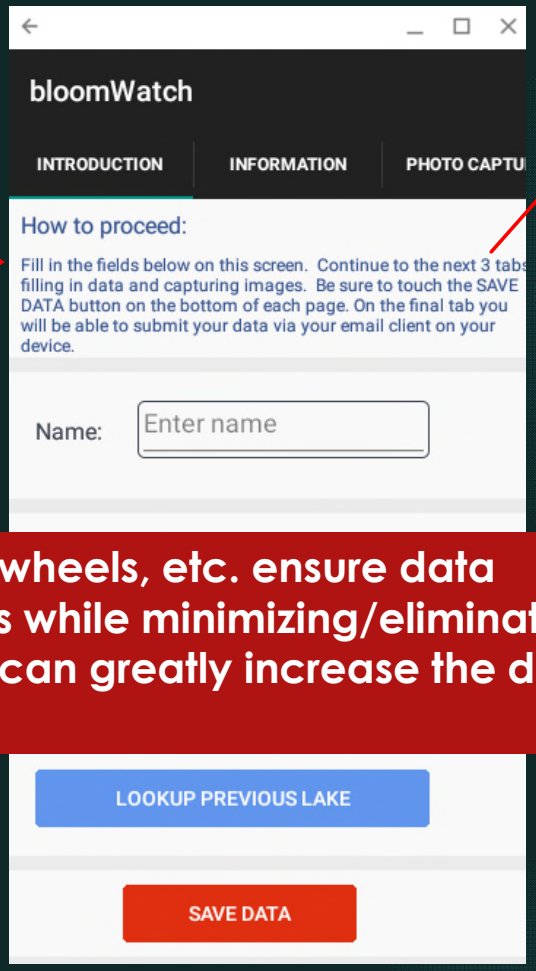
To determine the spatial and temporal patterns of bloom occurrence in the region

- Bare bones
- Educational
- Crowdsourced information
- Smart phone
- App- established methodology
- Data Visualization – public domain

Introduction & Basic Info Screen



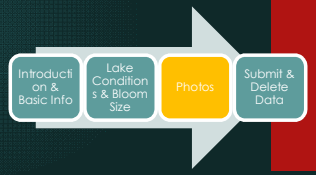


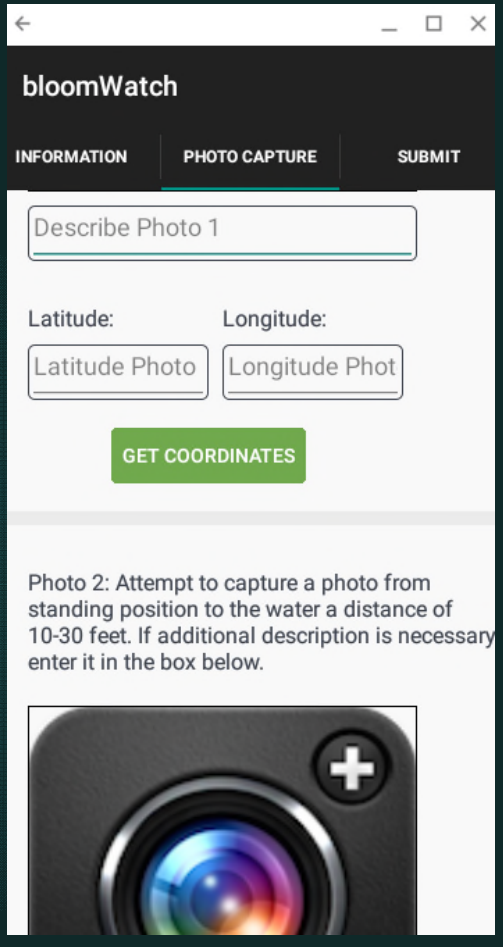


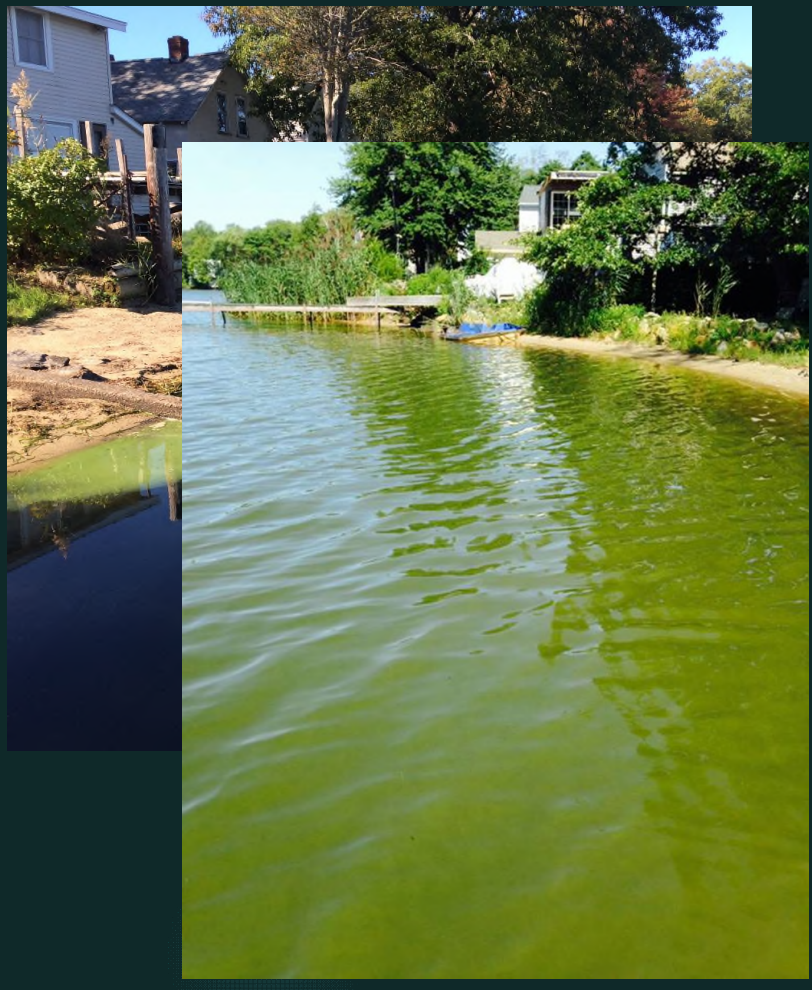
Video training clip to be installed

Drop downs, time stamps, calendar wheels, etc. ensure data input consistency and completeness while minimizing/eliminating transcription errors…crowdsourcing can greatly increase the data stream!

Photos Screen

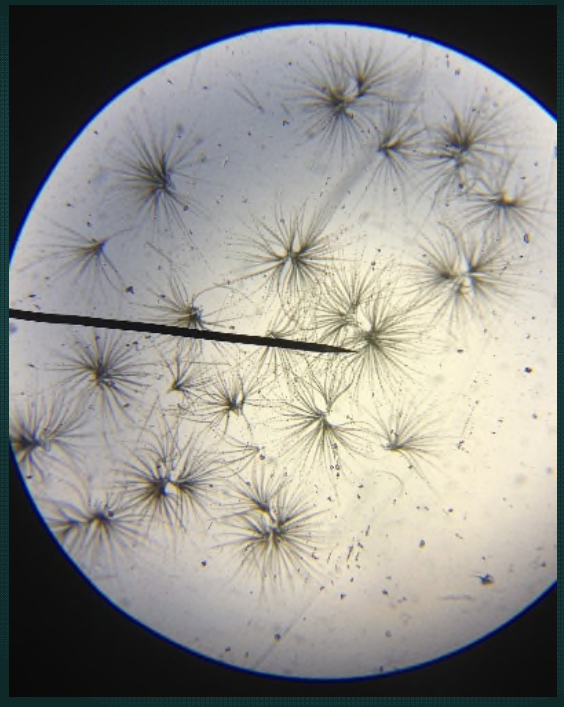






CyanoScope

Established to determine the occurrence and distribution of cyanobacteria genus/species across the region (mapping of potentially toxin producing waterbodies)



Leland

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Version:2.0

Welcome to the
App! Your name,
number, and nam
required to input
of instructions, p
following VIEW F

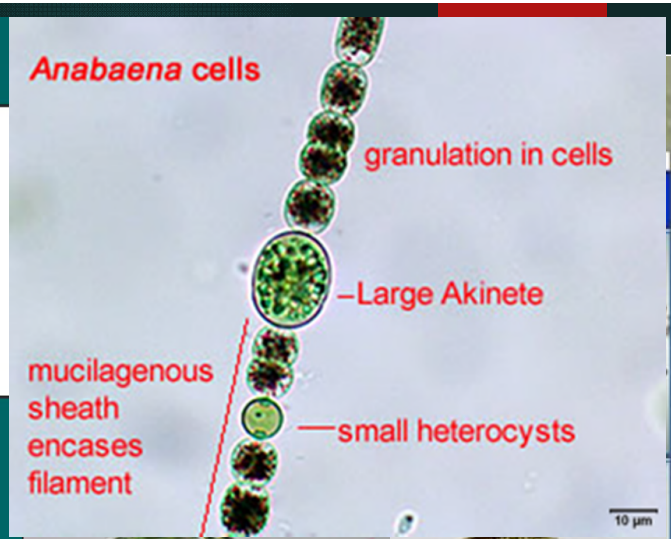
NAME:

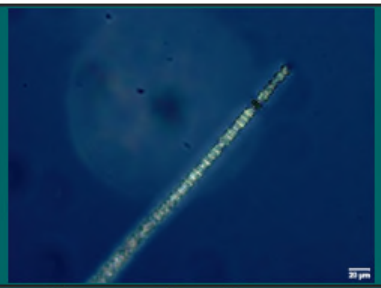
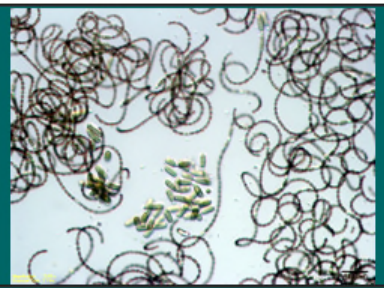
ADD NEW LAK

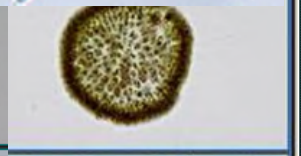
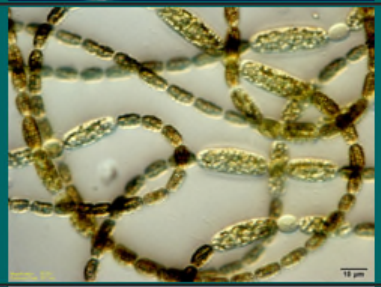
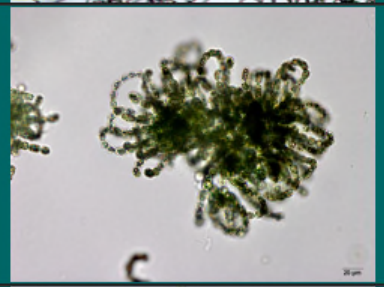
Anabaena / *Anabaenopsis*

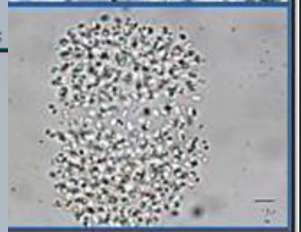
General Description

- *Anabaena* cells are usually arranged in filaments or chains and can be straight, spiralled, coiled or spring-like and often dscribed as "beaded"
- Filaments also have specialized cells called heterocysts and akinetes, used for fixing nitrogen and regenerating cells for future colonies
- A mucilagenous sheath surrounds the cells of the filament





CFB

Home

iNaturalist.org

1 Record your observations

2 Share with fellow naturalists

3 Discuss your findings

Contribute to Science

Every observation can contribute to biodiversity science, from the rarest butterfly to the most common backyard weed. We share your findings with scientific data repositories like the Global Biodiversity Information Facility to help scientists find and use your data. All you have to do is observe.

How to get started!

1. **Join the cyanoScope project on iNaturalist.org** → Create an account and join the project at: www.iNaturalist.org/projects/cyanoscope.
2. **Purchase the collection and microscopy kit on www.cyanoScope.org** → The kit includes: Portable microscope and supplies, an adapter to connect a smartphone or PC to the microscope, plankton net, and a cyanobacteria concentrator.
3. **Get Training** → Check our website, www.cyanoscope.org, for training materials and information on upcoming sessions.

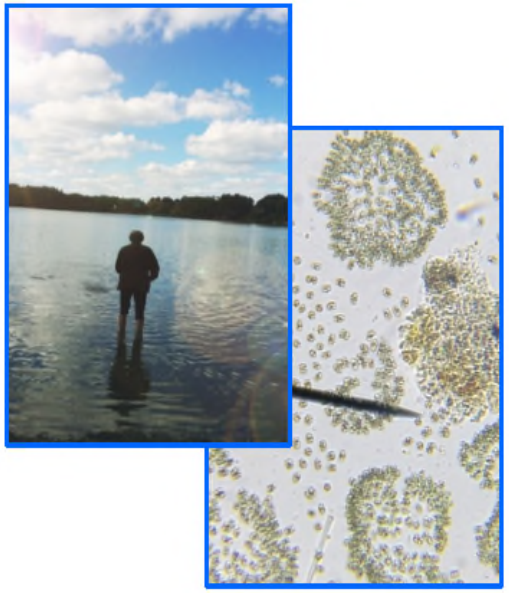
What is cyanoScope?

cyanoScope uses modern technologies and social media platforms to learn more about cyanobacteria.

By participating you will be helping scientists and water resource managers gain information on the occurrence and timing of cyanobacteria in lakes, ponds, and reservoirs.

Goals

- Public Outreach — Work with stakeholders to increase awareness of cyanobacteria.
- Crowdsourcing Identification — Use social media platforms to effectively and efficiently identify the cyanobacteria present in our waters.
- Scientific — Map the spatial distribution and seasonal occurrence of cyanobacteria in lakes, ponds, and reservoirs.



Participation Details

Collect

- Collect a water sample from your favorite lake or pond as you learned in training.
- Prepare your microscope slides.
- Now — hunt for cyanobacteria!

Report

- Upload your photos to the cyanoScope project on iNaturalist.
- Include basic information about where and when the sample was collected.

Interact

- Now the iNaturalist community can help identify the cyanobacteria.
- Get involved! Ask questions, submit your identifications, and learn about organisms that have been found near you.

CyanoMonitoring

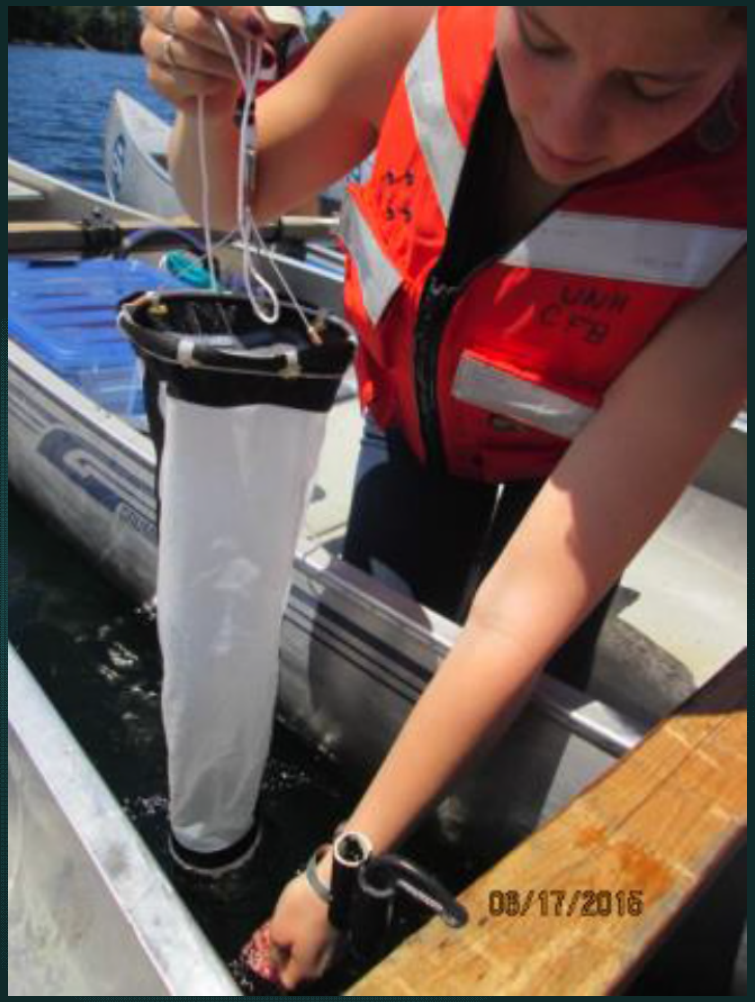
Tracking of cyanobacteria concentrations with efforts to forecast bloom occurrences, determine risk, and assess waterbody/human health vulnerability.

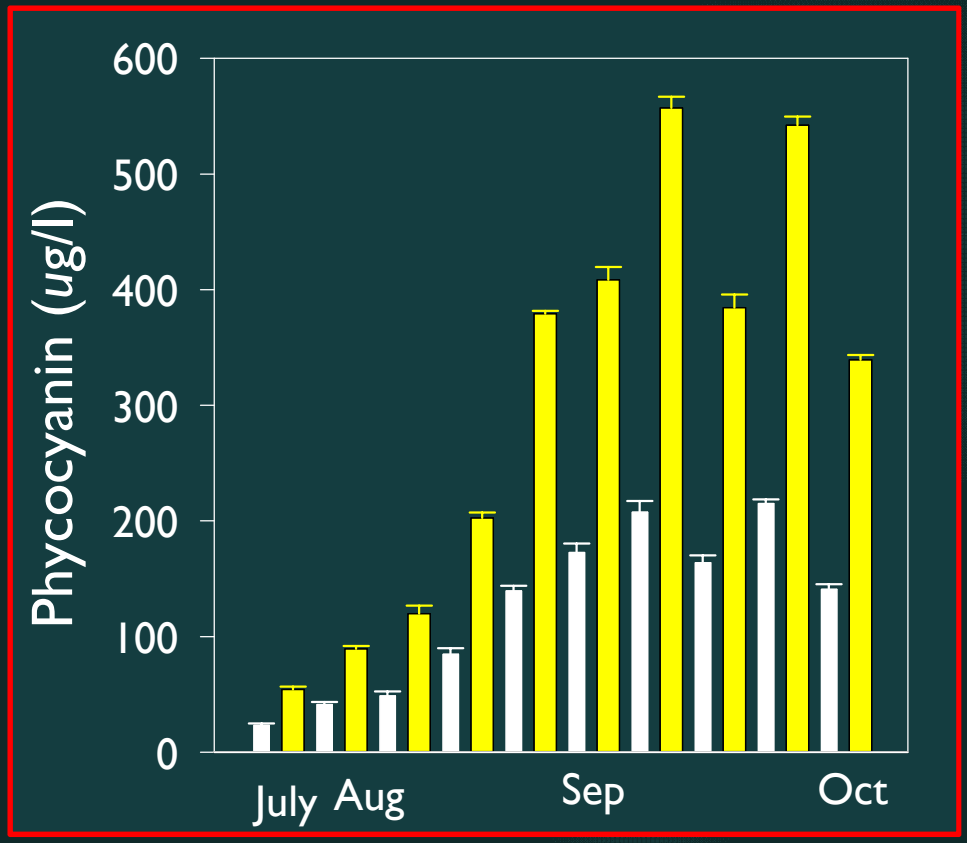
- Standardized methods
- App development
- Specialized low cost "Tool Kits"
- Centralized Data
- Data Visualization tools

Handheld 2-Channel Flourometer

- Chlorophyll a
  - .25 - 2,500 ppb
- Phycocyanin (improving MDL)
  - 10 - 100,000 ppb
- Other 2-chnl handhelds available
- $1,500 - $2,500
- Stnds approx. $200 each (2 month shelf)
- Rhodamine solid state standards (2 year shelf)

Sampling Methodology

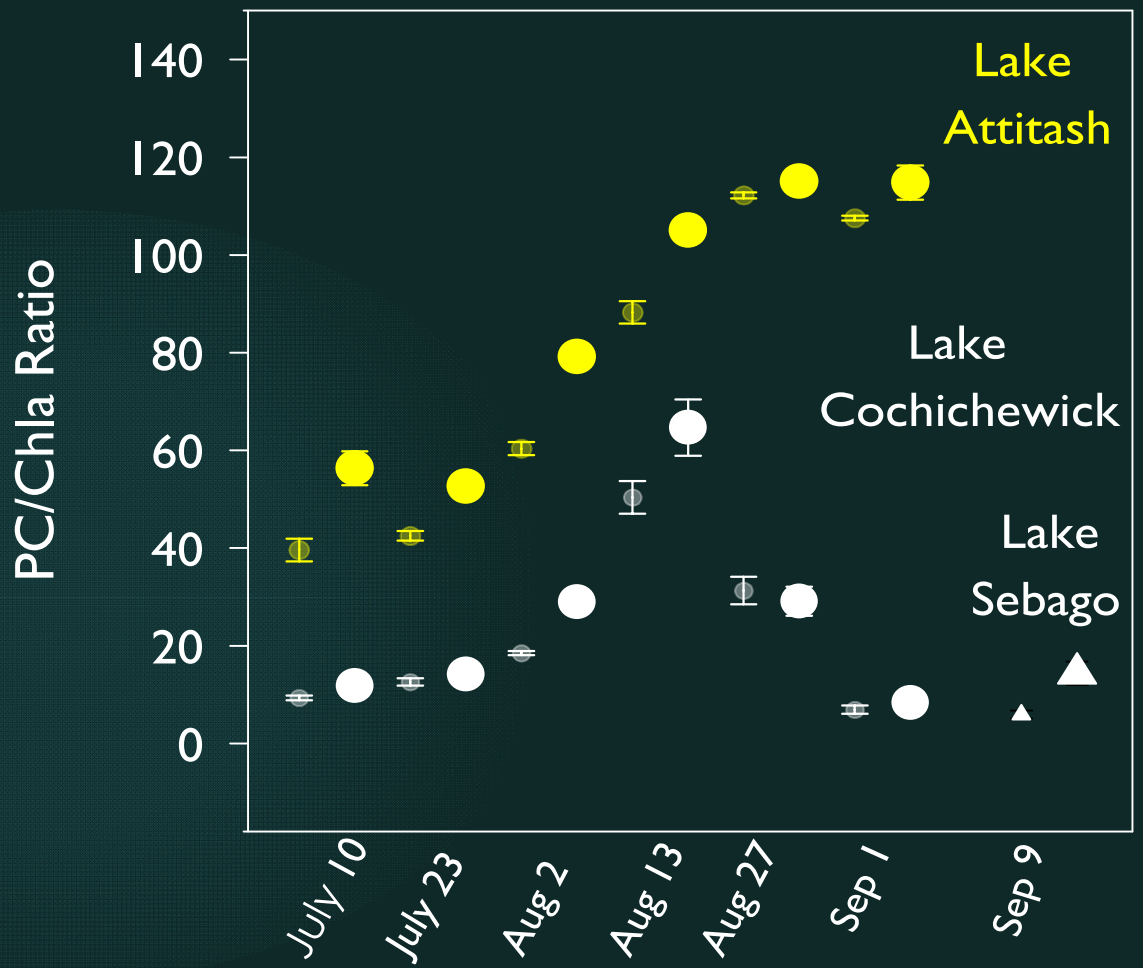




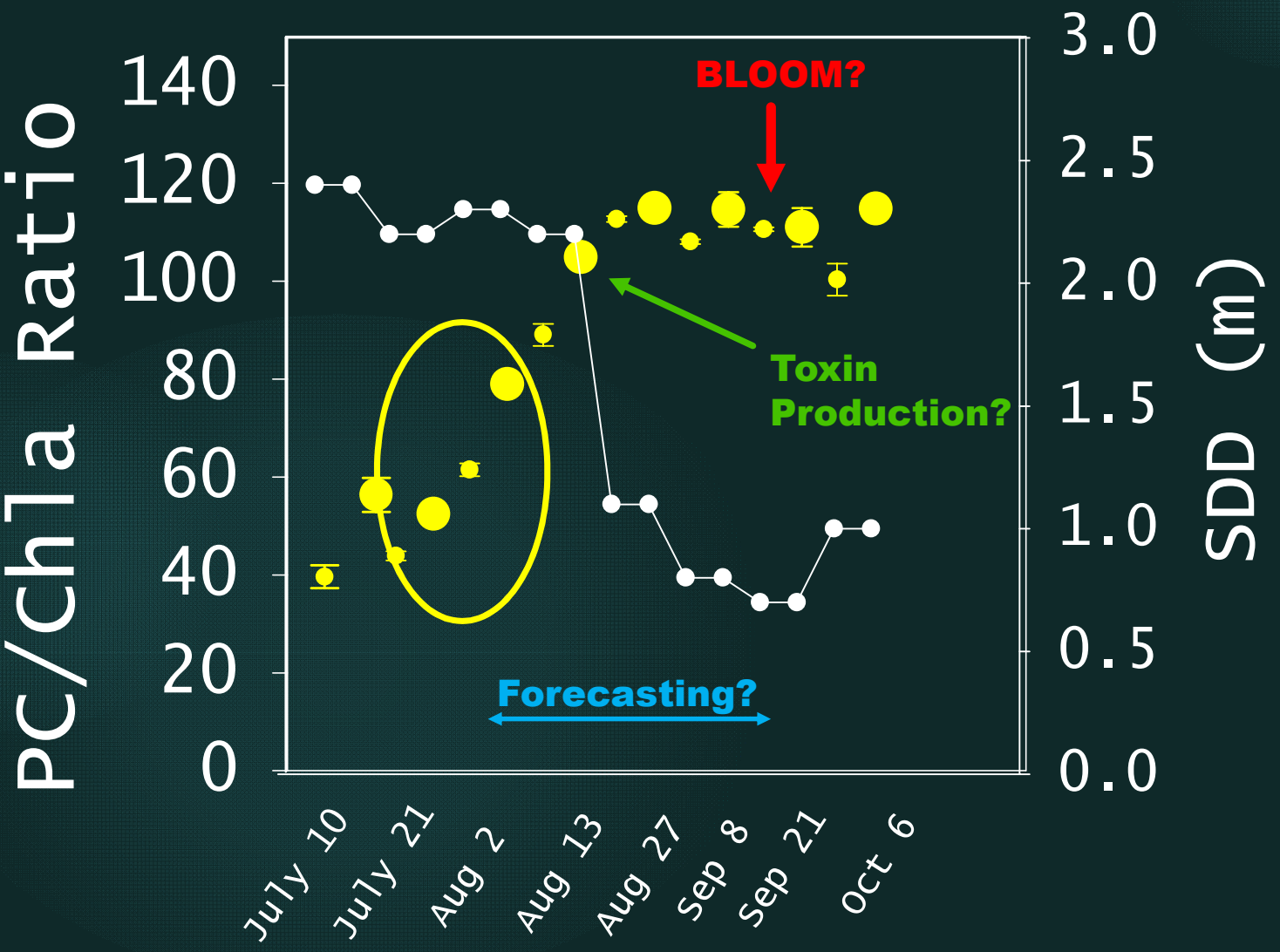
What happens across multiple study sites ??

Summer 2015

Lake Attitash, Lake Cochichewick and Lake Sebago

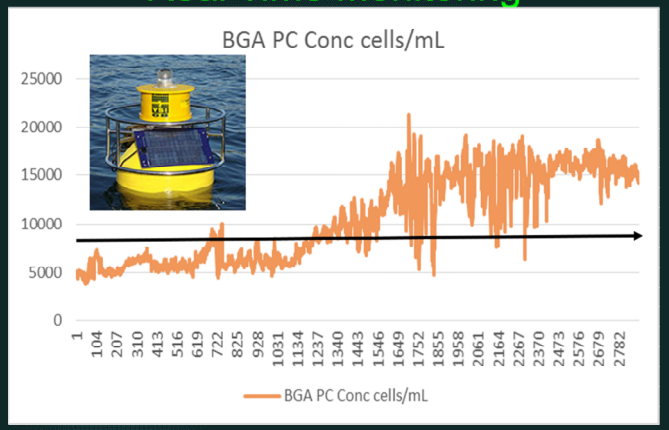


Leland



PC/Chla Ratio precedes Secchi Disk depth and is most sensitive parameter

Real Time Monitoring



Summary & Next Steps

- BloomWatchers
  - Smartphone Apps (training provided on the app)
  - CitSci submission (WIP)
- CyanoScope
  - App/microscope image training
  - iNaturalist submission
- Monitoring folks
  - Training on methods/kits (video clip & Mobile lab)
  - Forecasting (WIP, Pilot)
- Outreach
  - Mobile lab training roadshow?

ELISA testing possibly this summer in relation to PC/Chla work

Forecasting pilot project slated for this summer

Workgroup Participants

- VTDEC
- Lake Champlain Basin Monitoring Program
- NHDES Volunteer Monitoring Network
- NHDES Beaches/Lakes Program
- NHDES Drinking Water Program
- University of New Hampshire CFB
- University of New Hampshire Extension Office
- Lebanon NH PWS
- Manchester NH PWS
- Merideth NH PWS
- Pennichuck Water Works NH
- Wakefield New Hampshire Lakes Collaborative
- Maine DEP Lakes Program
- Maine Dover-Foxcroft Water District
- MADEP Watershed & Drinking water Programs
- Umass Amherst Dept. of Civil Engineering
- Massachusetts Abbington Rockland Water District
- Massachusetts Charles River Watershed Association
- University of Rhode Island Watershed Watch Partnership
- New England Interstate Water Pollution Control Commission
- USEPA Atlantic Ecology Division
- CTDEEP Ambient Monitoring Program
- CT Federation of Lakes
- USEPA Mid-Continent Ecology Division
- USGS
- Lim-Tex, LLC
- Eastern Analytical, Inc.
- Penobscot Nation
- Individual Citizen Scientists
- White Pond Lake Association
- Candlewood Lake Authority
- Lake Attitash Association
- Esperanza Academy

QUESTIONS?

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